

What is claimed is:

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1. A networking device comprising:  
optical switching logic coupled to a number of optical interfaces for  
5 sending or receiving an optical data stream over at least one optical fiber; and  
routing logic operably coupled to the optical switching logic and to a  
number of ports for routing information based upon a routing mechanism,  
wherein the optical switching logic and the routing logic interoperate to  
switch and route information for sending or receiving the optical data stream  
10 over the at least one optical fiber.
2. The networking device of claim 1, wherein the optical switching logic  
is operably coupled to receive an incoming optical data stream from an  
incoming optical fiber over an incoming optical interface and selectively pass  
15 the incoming optical data stream through to an outgoing optical fiber over an  
outgoing optical interface or divert the incoming optical data stream for  
processing by the routing logic.
3. The networking device of claim 2, wherein the optical switching logic  
20 comprises a demultiplexer operably coupled to demultiplex the incoming  
optical data stream from a number of incoming optical data streams received  
from the incoming optical fiber over the incoming optical interface.
4. The networking device of claim 3, wherein the optical switching logic  
25 further comprises an optical switch operably coupled to receive the incoming  
optical data stream from the demultiplexer and to selectively pass the  
incoming optical data stream through to the outgoing optical fiber over the  
outgoing optical interface or divert the incoming optical data stream for  
processing by the routing logic.
- 30 5. The networking device of claim 3, wherein the optical switch  
comprises an optical add/drop fabric.

6. The networking device of claim 3, wherein the optical switch comprises an optical drop-only fabric.

7. The networking device of claim 4, wherein the optical switching logic further comprises an optical receiver operably coupled to receive the diverted incoming optical data stream from the optical switch and convert the diverted incoming optical data stream into incoming digitally formatted information for processing by the routing logic.

8. The networking device of claim 7, wherein the routing logic is operably coupled to receive the incoming digitally formatted information from the optical receiver and route the incoming digitally formatted information based upon a routing mechanism.

9. The networking device of claim 1, wherein the routing logic is operably coupled to forward outgoing digitally formatted information to the optical switching logic for forwarding to an outgoing optical fiber over an outgoing optical interface.

10. The networking device of claim 9, wherein the optical switching logic is operably coupled to receive the outgoing digitally formatted information from the routing logic and output an outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

11. The networking device of claim 10, wherein the optical switching logic comprises an optical transmitter operably coupled to receive the outgoing digitally formatted information from the routing logic and produce the outgoing optical data stream from the digitally formatted information at a predetermined wavelength.

12. The networking device of claim 11, wherein the optical transmitter comprises a fixed wavelength laser for producing the outgoing optical data stream at the predetermined wavelength.

5 13. The networking device of claim 11, wherein the optical transmitter comprises a tunable laser tuned to produce the outgoing optical data stream at the predetermined wavelength.

14. The networking device of claim 11, wherein the optical switching logic  
10 further comprises:

an optical switch operably coupled to receive the outgoing optical data stream from the optical transmitter; and

a multiplexer operably coupled to receive the outgoing optical data stream from the optical switch and add the outgoing optical data stream to  
15 the outgoing optical fiber over the outgoing optical interface.

15. The networking device of claim 14, wherein the optical switch comprises an optical add/drop fabric.

20 16. The networking device of claim 11, wherein the optical switching logic further comprises a combiner operably coupled to receive the outgoing optical data stream from the optical transmitter and add the outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

25 17. The networking device of claim 1, wherein the networking device is an optical switch router.

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18. A system comprising:

optical switching logic coupled to a number of optical interfaces for sending or receiving an optical data stream over at least one optical fiber; and routing logic operably coupled to the optical switching logic and to a number of ports for routing information based upon a routing mechanism, wherein the optical switching logic and the routing logic interoperate to switch and route information for sending or receiving the optical data stream over the at least one optical fiber.

19. The system of claim 18, wherein the optical switching logic is operably coupled to receive an incoming optical data stream from an incoming optical fiber over an incoming optical interface and selectively pass the incoming optical data stream through to an outgoing optical fiber over an outgoing optical interface or divert the incoming optical data stream for processing by the routing logic.

20. The system of claim 19, wherein the optical switching logic comprises a demultiplexer operably coupled to demultiplex the incoming optical data stream from a number of incoming optical data streams received from the incoming optical fiber over the incoming optical interface.

21. The system of claim 20, wherein the optical switching logic further comprises an optical switch operably coupled to receive the incoming optical data stream from the demultiplexer and to selectively pass the incoming optical data stream through to the outgoing optical fiber over the outgoing optical interface or divert the incoming optical data stream for processing by the routing logic.

22. The system of claim 20, wherein the optical switch comprises an optical add/drop fabric.

23. The system of claim 20, wherein the optical switch comprises an optical drop-only fabric.

24. The system of claim 21, wherein the optical switching logic further  
5 comprises an optical receiver operably coupled to receive the diverted incoming optical data stream from the optical switch and convert the diverted incoming optical data stream into incoming digitally formatted information for processing by the routing logic.

10 25. The system of claim 24, wherein the routing logic is operably coupled to receive the incoming digitally formatted information from the optical receiver and route the incoming digitally formatted information based upon a routing mechanism.

15 26. The system of claim 18, wherein the routing logic is operably coupled to forward outgoing digitally formatted information to the optical switching logic for forwarding to an outgoing optical fiber over an outgoing optical interface.

20 27. The system of claim 26, wherein the optical switching logic is operably coupled to receive the outgoing digitally formatted information from the routing logic and output an outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

25 28. The system of claim 27, wherein the optical switching logic comprises an optical transmitter operably coupled to receive the outgoing digitally formatted information from the routing logic and produce the outgoing optical data stream from the digitally formatted information at a predetermined wavelength.

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29. The system of claim 28, wherein the optical transmitter comprises a fixed wavelength laser for producing the outgoing optical data stream at the predetermined wavelength.

5 30. The system of claim 28, wherein the optical transmitter comprises a tunable laser tuned to produce the outgoing optical data stream at the predetermined wavelength.

10 31. The system of claim 28, wherein the optical switching logic further comprises:  
an optical switch operably coupled to receive the outgoing optical data stream from the optical transmitter; and

15 a multiplexer operably coupled to receive the outgoing optical data stream from the optical switch and add the outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

32. The system of claim 31, wherein the optical switch comprises an optical add/drop fabric.

20 33. The system of claim 28, wherein the optical switching logic further comprises a combiner operably coupled to receive the outgoing optical data stream from the optical transmitter and add the outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

25 34. The system of claim 18, wherein the system is an optical switching/routing system.

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35. An optical line card for use in a networking device, the optical line card comprising:

a router interface; and

optical switching logic operably coupled to receive an incoming optical data stream from an incoming optical fiber over an incoming optical interface and selectively pass the incoming optical data stream through to an outgoing optical fiber over an outgoing optical interface or divert the incoming optical data stream over the router interface for processing by routing logic.

36. The optical line card of claim 35, wherein the optical switching logic comprises a demultiplexer operably coupled to demultiplex the incoming optical data stream from a number of incoming optical data streams received from the incoming optical fiber over the incoming optical interface.

37. The optical line card of claim 36, wherein the optical switching logic further comprises an optical switch operably coupled to receive the incoming optical data stream from the demultiplexer and to selectively pass the incoming optical data stream through to the outgoing optical fiber over the outgoing optical interface or divert the incoming optical data stream over the router interface for processing by the routing logic.

38. The optical line card of claim 36, wherein the optical switch comprises an optical add/drop fabric.

39. The optical line card of claim 36, wherein the optical switch comprises an optical drop-only fabric.

40. The optical line card of claim 37, wherein the optical switching logic further comprises an optical receiver operably coupled to receive the diverted incoming optical data stream from the optical switch and convert the diverted incoming optical data stream into incoming digitally formatted information for processing by the routing logic.

41. The optical line card of claim 40, wherein the routing logic is operably coupled to receive the incoming digitally formatted information from the optical receiver and route the incoming digitally formatted information based upon a routing mechanism.

42. The optical line card of claim 35, wherein the optical switching logic is operably coupled to receive outgoing digitally formatted information from the routing logic over the router interface and output an outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

43. The optical line card of claim 42, wherein the optical switching logic comprises an optical transmitter operably coupled to receive the outgoing digitally formatted information from the routing logic over the router interface and produce the outgoing optical data stream from the digitally formatted information at a predetermined wavelength.

44. The optical line card of claim 43, wherein the optical transmitter comprises a fixed wavelength laser for producing the outgoing optical data stream at the predetermined wavelength.

45. The optical line card of claim 43, wherein the optical transmitter comprises a tunable laser tuned to produce the outgoing optical data stream at the predetermined wavelength.

46. The optical line card of claim 43, wherein the optical switching logic further comprises:

an optical switch operably coupled to receive the outgoing optical data stream from the optical transmitter; and

a multiplexer operably coupled to receive the outgoing optical data stream from the optical switch and add the outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.



47. The optical line card of claim 46, wherein the optical switch comprises an optical add/drop fabric.

5 48. The optical line card of claim 43, wherein the optical switching logic further comprises a combiner operably coupled to receive the outgoing optical data stream from the optical transmitter and add the outgoing optical data stream to the outgoing optical fiber over the outgoing optical interface.

10 49. The optical line card of claim 35, wherein the incoming optical interface and the outgoing optical interface are on an optical physical card, and wherein the optical line card further comprises a physical card interface for coupling the optical switching logic to the incoming optical interface and the outgoing optical interface.

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50. A method for multicasting in an optical communication system, the method comprising:

receiving an optical data stream including multicast traffic;  
terminating the optical data stream; and

5 routing the multicast traffic using a predetermined multicast routing mechanism.

51. The method of claim 50, wherein receiving the optical data stream including multicast traffic comprises:

10 receiving the optical data stream over an incoming optical fiber.

52. The method of claim 51, wherein terminating the optical data stream comprises:

15 dropping the optical data stream from the incoming optical fiber; and  
converting the multicast traffic from an optical form into a digital form suitable for routing.

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